

Docket No.: 60617.301501

Patent

REMARKS

The Examiner is thanked for the comments in the Action. They have helped us considerably in understanding the Action and in drafting this Response thereto. It is our understanding that claims 1-10 and 13-34 remain pending in this application, claims 11-12 being herein canceled.

Rejections of the claims per § 103(a):

Claims 1-34 are rejected as being unpatentable (obvious) over Ellerbrock. Respectfully, this is error. A prima facie case for obviousness under 35 U.S.C. § 103(a) is usually summarized as requiring:

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure. MPEP § 2142

As put in our last Response, the Ellerbrock patent teaches what we term "Ellerbrock's inventive scheme" and "Ellerbrock's prior art scheme." We submit, however, that these two schemes cannot be combined to form a proper rejection of Applicant's claimed invention. There would be no reasonable expectation of success if these schemes were combined. There also is no suggestion or motivation, in the reference or in the generally available knowledge, to combine these schemes. And there is, of course, the matter of whether the combination teaches or reasonably suggests all of the claim limitations.

In the Action the Examiner argues that the teaching of Ellerbrock's inventive scheme provides all but one of the elements of claims 1 and 20, and that the teaching of Ellerbrock's prior art scheme provides that other element.

First, this analysis is wrong, at least as it still reads in the body of the Action and is the same as the last Action. Ellerbrock's inventive scheme lacks at least two elements of the claimed invention. We are in agreement with the Examiner that it does not include the filter modules

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recited in claims 1 and 20, but we submit that it also does not employ a wideband light beam and its sensor arrays (202) are different than Applicant's sensor modules.

The light source (204) of Ellerbrock's inventive scheme is labeled a "*TUNABLE NARROW BAND LIGHT SOURCE*" in FIG. 2 and the text terms this a "*tunable narrow band light source 204*" (col. 5, ln. 32). The text discusses this as such specifically, or as a broad band light source in combination with a filter to achieve a narrow bandwidth light beam (col. 5, ln. 31-36). [The Examiner may actually appreciate this point already. While the rejection language itself is still unchanged from the last Action, the new Response to Arguments states that Ellerbrock's prior art scheme includes a wideband light source. We agree that it does.]

The sensor arrays (202) of Ellerbrock's inventive scheme are arrays of sensors, not simple single sensors. See e.g., FIG. 3, depicting a plurality of elements labeled "*4 SENSOR ARRAY 328*." At col. 5, ln. 20-30 the text of Ellerbrock even further informs us that its sensor arrays (202) each include at least two fiber Bragg gratings. Also, the sensor arrays (SA1, SA2) of Ellerbrock's prior art scheme are also each arrays of multiple sensing units (col. 1, ln. 30-49).

This cannot be reconciled with the claimed invention, which is disclosed as and requires using a sensor module (14) having only a single fiber Bragg grating (FBG 32) (see e.g., FIG. 2-3). Claim 1 previously recited "*a fiber Bragg grating*" but is herein amended to recite "*a single fiber Bragg grating*," thus explicitly stating and emphasizing this distinction over both of Ellerbrock's schemes. Claim 20 is not amended, since it already recites that each FBG there reflects a first portion of the light beam and if a plurality of FBGs were used in an array similar to Ellerbrock's schemes there would have to be a corresponding number of light beam portions.

Before turning to whether the schemes can be combined, however, we urge that there is another "*all of the claim limitations*" flaw in the analysis underlying the rejection. The Examiner concedes that Ellerbrock's inventive scheme does not teach filter modules as recited in claims 1 and 20. The Action states "*Ellerbrock discloses (prior art section, fig 1) a system [that] comprises: a plurality of filter modules TF1, TF2 (fig 1) wherein each said filter module includes a filter device and a photodetector PDI (fig 1) to produce a detector signal.*" But much is apparently being missed here.

First, the filtering elements taught by Ellerbrock's prior art scheme are tunable filters that are driven by a signal from a waveform generator (WG) that is also (necessarily) fed to its

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monitoring and controlling system (A/D & DSP). Absent any qualifying or elaborating language, one of ordinary skill in the art would understand Applicant's claims to include simple optical filters, not tunable optical filters, which are very specialized devices, requiring considerable additional circuitry to work that is clearly not present in the claimed invention. Nonetheless, in a responsive spirit, we herein amend claims 1 and 20 to emphasize that fixed-frequency light is filtered with standard optical filters. Support for this can be seen in the specification in paragraphs [0022]-[0024] and in FIG. 4a-c.

Second, the detector elements taught by Ellerbrock's prior art scheme are peak detectors, for detecting the peak as its tunable filters are adjusted across a bandwidth with its waveform generator to generate a digital pulse for triggering the A/D element (col. 1, ln. 50-61). Again in a responsive spirit, we herein amend claims 1 and 20 to emphasize that Applicant's detector elements produce detector signals that are either heterodyne beat-based or intensity-based. Again, paragraphs [0022]-[0024] and in FIG. 4a-c support this.

Summarizing, Ellerbrock's prior art scheme uses broad band light, Ellerbrock's inventive scheme does not. Applicant's claimed invention uses a wideband light beam. Neither of Ellerbrock's schemes teaches sensing apparatus or steps equivalent to Applicant's. And neither of Ellerbrock's schemes teaches filtering or detection apparatus or steps equivalent to Applicant's. Since the combination employed for the rejection here does not teach or reasonably suggest all the claim limitations, a prima facie case for obviousness should fail and the claims thus be allowable.

In the alternative, however, the other two prongs of a prima facie case for obviousness also cannot be met based on Ellerbrock's two schemes.

Ellerbrock's schemes employ different principles of operation. Its prior art scheme employs a fixed broad band light beam with tunable filters and supporting apparatus for controlling those filters to narrowly detect frequency peaks. In contrast, its inventive scheme employs a tunable narrow band light source as well as supporting apparatus for controlling that with unfiltered peak detection. MPEP 2143.01 guides us:

If the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. In re Ratti, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

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Furthermore, using the fixed broad band light beam of Ellerbrock's prior art scheme in its inventive scheme obviously would not work with the apparatus there, and using the tuned narrow band light of its inventive scheme would not work in its prior art scheme. Similarly, using the tunable filters of its prior art scheme would be pointless in its inventive scheme, which does not use filtration, and removing the tunable filters from its prior art scheme (to make it resemble its inventive scheme) also would not work. MPEP 2143.01 also guides us:

If a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. In re Gordon, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

The above addresses claims 1 and 20, and thus all of the other claims by their depending from claims 1 and 20. The Action, however, includes extensive discussion of the dependant claims. We remark now on that discussion where we feel it is necessary to clarify things.

The Action states "*With respect to claims 2-4, 21-23, Ellerbrock does not disclose the frequency locking sub-system. However, it would have been obvious to modify Ellerbrock with the claimed frequency locking sub-system to control the output of the light source for facilitating the measurement.*" First, we have shown numerous problems with this above. But all of this apparently leads back to the Examiner having apparently missed a major point. Both of Ellerbrock's schemes employ tunable adjustment of some key elements – yet the claimed invention does not tunably adjust any elements.

The Action also states "*With respect to claims 5, 24, Ellerbrock discloses a system including temperature sensors (column 4, lines 53-67).*" But what Ellerbrock says at the cite is merely that one of its FBG sensors may be used to detect temperature rather than strain. And the Action continues "*However, Ellerbrock does not disclose normalizing the detector signals based on the temperature signals. It would have been obvious to modify Ellerbrock with the claimed normalizing step to calibrate the sensors so that the system could be used in different environments.*" This appears to be 20/20 hindsight based on Applicant's disclosure, and it is wrong even then. The Examiner apparently does not grasp the distinction between initial calibration and signal normalization. For example, one may install a temperature-sensitive system when the temperature is 70°F, and calibrate the system at that temperature, but this is

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merely initial calibration. What if the temperature changes? Say, it becomes 90°F. Normalization is an ongoing process that can deal with this.

The Action also states "*With respect to claims 6,25, Ellerbrock discloses that the system could be used to sense different parameters (column 4, lines 60-65). It would have been obvious to modify Ellerbrock with the claimed intensity sensor to normalize the detector signals in order to use the system in different environments.*" First, as already discussed, the Examiner apparently did not understand what normalization is. Second, Ellerbrock's inventive scheme uses a peak detection-based principle of operation that simply would not benefit from intensity normalization. Third, Applicant's purpose is more than merely use in "*different environments.*" For instance, changes in temperature, pressure, and age can all effect intensity, e.g., some types of semiconductor lasers are notorious for changing intensity as they become older.

The Action also states "*With respect to Claim 8, it would have been obvious to modify Ellerbrock sensor to monitor different structures for different testing purposes.*" Respectfully, this is a gross naked assertion without any support under the legal standard. The Examiner needs to either cite some prior art and apply the law, or allow the claim.

The Action also states "*With respect to claims 11-12, since the general conditions of the invention were disclosed by the prior arts, modifying the sensor and filter modules to form a single or multi-ports configuration for different using purposes involves only routine skill in the art.*" These claims are error. They never should have been included in this application and are now nonsensical. The present specification does not teach ports and we have no idea what such would mean in the present context. Claims 11-12 are accordingly herein canceled.

And the Action further states "*With respect to claims 14,28, Ellerbrock discloses using a broadband light source and each sensor operating in different bandwidth (column 5, lines 1-15 and lines 30-40).*" However, col. 5 at lines 1-15 merely discusses sensors operating in different bandwidths and at ln. 30-40 it specifically recites a tunable narrow band light source or using a filtered broad band light source to achieve the same thing.

Remarks on the Response to Arguments:

The Action here states "*With respect to applicant's argument about the "single wideband type". Ellerbrock did disclose using a single wideband type (BBLSI, fig 1) for a plurality of sensor modules (SENSOR ARRAY 1, FIG 1) wherein each sensor module including a fiber Bragg*

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grating (refer to fig 3). As discussed above, this is in Ellerbrock's prior art scheme, which we have shown cannot be combined with Ellerbrock's inventive scheme.

The Action continues "*With respect to applicant's argument about the "fixed wavelength type filter", applicant does not explicitly claim the fixed wavelength type filter as argued.* We have addressed this with clarifying amendment, and we note that one of ordinary skill in the art would understand that a simple optical filter is quite different than a tunable optical filter, which is a very specialized device requiring considerable additional supporting elements to even work.

And the Action continues "*Further, Ellerbrock's tunable filter could be used as the argued fixed wavelength filter type.*" Respectfully, this appears to be pure conjecture, and wrong for sound technical reasons. Such would be undesirable because it would provide no benefit; it would undermine the stability of the resulting system; and it would necessitate additional elements, such as the waveform generator (WG) in FIG. 1 or a stabilized controllable voltage source (as used by most tunable optical filters).

CONCLUSION

Applicant has endeavored to put this case into complete condition for allowance. It is thought that the §103 rejections have all been addressed by amendment or completely rebutted. Applicant therefore asks that all objections and rejections now be withdrawn and that allowance of all claims presently in the case be granted.

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Respectfully Submitted,



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